Westmont Climate Action Plan

August 2, 2010

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SUMMARY

Under the U.S. Conference of Mayors Climate Protection Agreement, municipalities like Westmont have committed to set goals for reducing greenhouse gas emissions, and strive to achieve those goals in their own communities through actions ranging from anti-sprawl land use policies to urban forest restoration projects to public information campaigns. State, federal and international actions are also needed to address the problem of greenhouse gas emissions, and a number of those actions have already been initiated while other proposals are currently being debated and negotiated.

Westmont had already initiated several actions that tend to reduce greenhouse gas emissions before it was asked to join the Mayors Climate Protection Program. These actions include promoting transit-oriented development, establishing bike routes and promoting public transit, purchasing Energy Star® equipment and appliances for municipal operations, increasing recycling rates throughout the community, converting municipal diesel vehicles to bio-diesel (earning recognition under the Illinois Green Fleets Program), and planting many trees every year (earning a "Tree City" award).

This Climate Action Plan includes 16 strategies for reducing direct greenhouse gas emissions from the entire community by 7% below the 2000 level by 2012 and 20% by 2020. It also includes 8 strategies for reducing direct greenhouse gas emissions from municipal operations by 40% below the 2000 level by 2012, and 45% by 2020. Some of these strategies are new, while others are a continuation of ongoing efforts. Most of the strategies in this Climate Protection Plan involve money-saving energy conservation proposals that will help to reduce household, business, and municipal fuel costs and utility bills for many years into the future.

Clearly, state, federal, and international programs and policies are needed to hold global warming within a reasonable range to prevent dire consequences. In the meantime while those programs and policies continue to take shape, there is plenty that Westmont can do to help.

INTRODUCTION

On December 7, 2009, the U.S Environmental Protection Agency (EPA) made the finding that global warming endangers the health and welfare of current and future generations.[1] The data shows that greenhouse gas levels in the atmosphere are at record high levels, and that the Earth has been warming over the past 100 years, with the steepest increase in the most recent decades. The evidence of human-induced climate change goes beyond the observed increases in average surface temperatures; it also includes melting ice in the Arctic, melting glaciers around the world, increasing ocean temperatures, rising sea levels, acidification of the oceans due to excess carbon dioxide, changing precipitation patterns, and changing patterns of ecosystems and wildlife.

Under a 2007 Supreme Court decision, EPA was required to determine whether global warming can reasonably be determined to endanger public health and welfare. EPA published its proposed decision in April 2009, and held a 60-day public comment which ended in June. Thousands of comments were received on 683 issues. EPA carefully considered all of the comments, and prepared a written response to each of the issues before it made the final decision (see http://epa.gov/climatechange/endangerment.html)

In 2007, the Mayor of Westmont[2] signed the U.S. Conference of Mayors Climate Protection Agreement. Under that agreement, cities commit to take the following three actions: (1) Strive to meet or beat the Kyoto Protocol targets in their own communities, through actions ranging from anti-sprawl land use policies to urban forest restoration projects to public information campaigns; (2) Urge their state governments, and the federal government, to enact policies and programs to meet or beat the greenhouse gas emission target suggested for the United States in the Kyoto Protocol - 7% reduction from 1990 levels by 2012; and (3) Urge the U.S Congress to pass bipartisan greenhouse gas reduction legislation, which would establish a national emission trading system.

This is Westmont's action plan to help hold global warming caused by human activities within a reasonable range to prevent dire consequences. Our plan includes an inventory of direct global warming emissions generated in the Village of Westmont's municipal operations and throughout our community, sets reduction targets for those direct emissions, and establishes an action plan for achieving those targets.

This plan addresses indirect emissions differently. Upstream indirect emissions are the greenhouse gases that are emitted in other communities in order to provide goods and services to Westmont residents and businesses. For example, although Westmont residents and businesses use industrial products, our plan does not set specific goals for reducing the emissions from any industries located outside of Westmont. The most significant upstream indirect emissions come from the coal-fired power plants located in other communities that produce electricity for Westmont residents and businesses. Our

[1] http://epa.gov/climatechange/endangerment.html

[2] Westmont IL is a suburban community located 22 miles west of downtown Chicago. It covers 5 square miles. The population has grown from 21,228 in 1990 to 24,554 in 2000, to 26,211 in 2007. The Chicago Metropolitan Agency for Planning projects that the population will grow to 27,000 by 2030.

inventory describes the amount of the indirect emissions from our use of electricity, and several of our strategies cover using electricity more efficiently. But since Westmont does not control the way that the electricity is generated, our plan does not set a specific goal for reducing these indirect emissions.

Likewise, our plan includes strategies to help reduce the downstream indirect emissions from disposal of our solid waste in landfills that are located in other communities. But since Westmont does not control important factors such as the design of the gas collection systems at those landfills, our plan does not set specific goals for reducing those indirect emissions.

The U.S. Conference of Mayors specifically suggests that cities should take the following actions, and Westmont had already begun several of them prior to signing the agreement:

1. Inventory global warming emissions in City operations and in the community, set reduction targets and create an action plan.
2. Adopt and enforce land-use policies that reduce sprawl, preserve open space, and create compact, walkable urban communities;
3. Promote transportation options such as bicycle trails, commute trip reduction programs, incentives for car pooling and public transit;
4. Increase the use of clean, alternative energy by, for example, investing in "green tags", advocating for the development of renewable energy resources, recovering landfill methane for energy production, and supporting the use of waste to energy technology;
5. Make energy efficiency a priority through building code improvements, retrofitting city facilities with energy efficient lighting and urging employees to conserve energy and save money;
6. Purchase only Energy Star® equipment and appliances for City use;
7. Practice and promote sustainable building practices using the U.S. Green Building Council's LEED program or a similar system;
8. Increase the average fuel efficiency of municipal fleet vehicles; reduce the number of vehicles; launch an employee education program including anti-idling messages; convert diesel vehicles to bio-diesel;
9. Evaluate opportunities to increase pump efficiency in water and wastewater systems; recover wastewater treatment methane for energy production;
10. Increase recycling rates in City operations and in the community;
11. Maintain healthy urban forests; promote tree planting to increase shading and to absorb CO2; and
12. Help educate the public, schools, other jurisdictions, professional associations, business and industry about reducing global warming pollution.

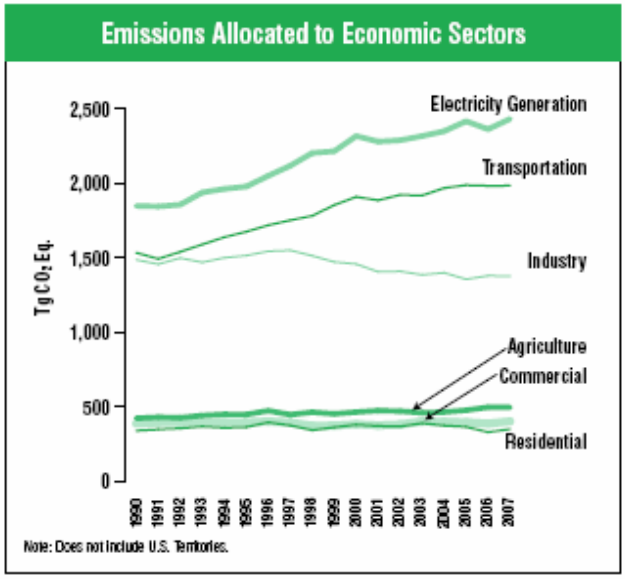
BACKGROUND

There are six main greenhouse gases. According to the *Inventory of U.S Greenhouse Gas Emissions and Sinks: 1990-2007 (April 2009)*[3], carbon dioxide is responsible for 85.4% of the heat-trapping effect of these gases, methane is responsible for 8.2%, nitrous oxide is responsible for 4.4%, and the other three gases[4] combined are responsible for 2.1% . Most of the carbon dioxide emissions come from burning coal, petroleum, and natural gas. Some methane and nitrous oxide is also emitted when these fuels are burned.

About 34% of greenhouse emissions come from power plants that produce electricity by burning fossil fuels (mostly coal), and sell the electricity to residential, commercial and industrial customers. About 28% comes from transportation (mostly burning petroleum). Most of the remainder comes from industrial smokestacks, the heating of residential and commercial buildings, agriculture, sewage treatment, and solid waste landfills.

In Illinois, we use less energy per capita than the national average. There are 32 states that use more energy per capita than Illinois, and 17 states that use less.[5]

Figure 1[6]



When the emissions from generating electricity are distributed among those other economic sectors that use the electricity, we find that residential and commercial buildings are responsible for about 32% of all greenhouse gas emissions, including direct

[3] http://www.epa.gov/climatechange/emissions/usinventoryreport.html
[4] hydrofluorocarbons, perfluorocarbons, sulfur hexafluorides
[5] http://tonto.eia.doe.gov/state/state_energy_rankings.cfm?keyid=60&orderid=1
[6] *Inventory of U.S Greenhouse Gas Emissions and Sinks: 1990-2007 (April 2009),* Executive Summary, page ES-16, http://www.epa.gov/climatechange/emissions/downloads09/GHG2007-ES-508.pdf ,

emissions from burning natural gas and a share of the emissions from generating electricity.

As discussed later in this Climate Action Plan, important changes are underway at the state and national level that will allow residents and commercial businesses in Westmont to purchase more energy-efficient vehicles, household appliances, and other products in the future. Further national and international actions are still needed to cause changes in the way that electricity is generated in the United States. This is the main issue of the proposed climate protection legislation currently being considered by Congress.

Typically 65% to 90% of the electricity sold by Commonwealth Edison (an Exelon company) is generated from sources that have no greenhouse gas emissions. Most of the remainder is generated from coal, and up to 5% is generated from natural gas. Illinois residential electricity prices are near the national average.[7]

Nationwide, the picture doesn't look as good. Only about 30% of the electricity is generated without any greenhouse gas emissions, about 50% is generated from burning coal, and about 20% from burning natural gas.

Electricity generated from nuclear, hydroelectric, wind, and solar energy have no greenhouse gas emissions. Illinois and Pennsylvania together account for about one-fifth of the nation's nuclear power generation.[8] All six of the nuclear power plants in Illinois are owned by Exelon and are located in northern Illinois.

Exelon sold off all six of the coal-fired power plants located within the Commonwealth Edison (ComEd) service territory in 1999 to Midwest Generation LLC, a subsidiary of Edison International. Two of the plants (Fisk and Crawford) are located in Chicago, two plants are located in Joliet, one in Romeoville, and one in Waukegan.[9] Air pollution from Fisk and Crawford have been linked to more than 40 deaths, 550 emergency room visits and 2800 asthma attacks per year.[10]

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[7] http://tonto.eia.doe.gov/state/state_energy_rankings.cfm?keyid=18&orderid=1

[8] http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=US

[9] http://www.sourcewatch.org/index.php?title=Midwest_Generation

[10] http://www.lungchicago.org/fisk3/

TARGETS

Community: Reduce direct greenhouse gas emissions overall by at least 7% below the 2000 level by 2012, and 20% by 2020.

Direct emissions from burning non-renewable vehicle fuels: By 2016, Westmont residents and businesses will be able to choose cars and light trucks that are about 30% more fuel-efficient than those sold in 2000. As our older vehicles wear out, we will replace them with newer, more fuel-efficient vehicles. We estimate that by 2020, about 40% of the vehicles in Westmont will meet the 2016 standards, and another 40% will be model year 2012-2016 vehicles (about 20% more fuel efficient than 2000), and most of the remainder will be model year 2008-2012 vehicles (about 10-15% more fuel efficient than 2000). In addition, the EPA might raise the limit on the amount of ethanol in gasoline from 10% to 15% or more.

Direct emissions from heating buildings with non-renewable fuels: By 2020, most of the furnaces that were manufactured before 1992 will be replaced with more modern, fuel-efficient models. We predict that more than half of Westmont residents and businesses who replace their furnaces will select units that meet or exceed the Energy Star® standard.

Bear in mind that the population of Westmont will be about 7% higher in 2012 than it was in 2000, and will be 8 or 9% higher in 2020. Population growth makes it harder to meet the goals for reducing greenhouse gas emissions because it means there will be more cars and more housing units in Westmont.

Municipal Operations: Reduce direct greenhouse gas emissions from the 2000 level by 40% by 2012 and 45% by 2020.

Direct emissions from non-renewable vehicle fuels: By 2009, greenhouse gas emissions from Village-owned vehicles had already been reduced by 24% below the 2000 level. That's a reduction of 236 metric tons per year. We can achieve a reduction of another 20% (200 metric tons per year) by 2012 by converting half of the gasoline-powered vehicle fleet to E-85. Another 20% reduction can be achieved by converting the other half of the gasoline-powered fleet to E-85 by 2020. Additional reductions can be achieved by purchasing more fuel efficient vehicles, maximizing the use of biodiesel, and reducing the number of vehicles that the Village owns.

Direct Emission from natural gas in buildings: By 2009, greenhouse gas emissions from Village-owned buildings had already been reduced by 26% below the 2000 level. Conducting energy audits on all the Village-owned buildings and implementing the recommendations can reduce greenhouse gas emissions by another 7 to 11% below the 2000 level. We can reduce greenhouse gas emissions by 30% below the 2000 level by 2012 by making half the recommended improvements, and by 35% by 2020 making the other half.

Accountability: Every year, Village staff should prepare a report describing the progress toward reducing greenhouse gas emissions in municipal operations as well as the throughout the community. These reports should be submitted to the Village Board, and should also be posted on the Village's website.

COMMUNITY STRATEGIES

Transportation

1. Fuel economy

Recommendation: When Westmont residents and businesses need to replace their older inefficient vehicles, they should continue to replace them with more fuel efficient vehicles whenever possible.

Discussion: Since fuel prices spiked in 2008, people in Westmont and throughout the United States have been buying more fuel efficient vehicles. In addition, the federal Energy Independence and Security Act (EISA) was enacted in 2007. Among other things, this law requires auto makers to increase Corporate Average Fuel Economy (CAFE) standards for cars and light trucks to 35 miles per gallon by 2020. Although the Department of Transportation (DOT) does not calculate fuel efficiency for the CAFE standards the same way the Environmental Protection Agency calculates fuel efficiency for the vehicle window stickers in new cars, the cars and trucks to be sold in the future will be about 30% more fuel efficient than those that were sold in the past. Cars that meet the new standard will cost about $950 more, but will save about $4,000 in fuel costs over the life of the car, for a net savings of about $3,000. On April 1, 2010, DOT and EPA jointly announced final regulations that will phase in these improvements beginning with model year 2012 and achieving the EISA standard by model year 2016.[11] In May, 2010, DOT and EPA began working to develop additional improvements for model years 2017 and beyond. In addition, they are working to develop the first ever fuel economy standards for medium and heavy-duty trucks for model years 2014 through 2018.

Some people might be surprised to learn that the weight of the gasoline that a car uses exceeds the weight of the car. For example, a 4,000-pound car that averages 20 miles per gallon over a 100,000-mile lifetime uses 5,000 gallons of gasoline. Those 5,000 gallons of gasoline weigh more than 30,000 pounds.

2. Alternative fuels

Recommendation: Westmont residents and businesses should consider using blended vehicle fuels containing high concentrations of renewable fuels whenever they can be used safely without damaging their vehicles, and when these fuels are conveniently

[11] http://www.epa.gov/otaq/climate/regulations/420f10014.htm

available at a reasonable price.

Discussion: Ordinary gasoline in the Chicago metropolitan area contains about 10% ethanol (E-10) to help control urban smog.[12] Gasoline sold in other areas where urban smog is not a concern might not contain any ethanol at all (E-0). Cars get about the same gas mileage with E-10 as they do with E-0. Burning a blend that contains 85% ethanol (E-85) can cause damage to some vehicle components unless they are designed to accommodate ethanol. Accordingly, some cars and trucks, called "flex fuel" vehicles, have been designed to burn blended fuels that contain up to 85% ethanol without any damage. Currently, the closest gas station offering E-85 to the public is in Lombard.[13] So unless Westmont residents who own flex-fuel vehicles commute by car to a location like Lombard, where E-85 can be purchased conveniently, the use of E-85 is not currently practical.

Cars get fewer miles per gallon when running on E-85, but the carbon dioxide emissions from burning renewable part of the blended fuel are not counted as greenhouse gas emissions. This is because plants, such as corn and soybeans, take carbon dioxide from the atmosphere as they grow. Thus, burning fuels made from plants does not significantly increase the average concentration of carbon dioxide in the atmosphere.

Some Westmont residents and businesses use diesel-powered vehicles. They can use a blended fuel containing up to 20% of a soybean oil product without damaging their vehicles. This blend is called "biodiesel". The nearest station offering biodiesel is in Summit.[14]

Overall in 2006, about 140 billion gallons of gasoline containing about 5 billion gallons of ethanol were used nationally.[15] Only about 250 million gallons of biodiesel were blended into diesel fuel in 2006. The United States imported 57% of the petroleum that it consumed in 2008.[16] This raises a national security concern, and involves a transfer of wealth from the USA to other countries. Using fuels made from locally grown plants helps address these issues. The federal Energy Independence and Security Act of 2007 requires at least 15 billion gallons of biofuel to be used by 2015, 30 billion gallons by 2020, and 36 billion gallons by 2022.[17] The law also requires an increasing percentage of our biofuels to be "advanced biofuels" such as celulosic ethanol. Advanced biofuel means biofuel made from anything other than corn.

To achieve these renewable fuel goals, it would be necessary to blend ethanol into ordinary gasoline at levels greater than the current limit of 10%. A coalition of ethanol producers submitted an application asking to EPA to allow up to 15% ethanol in ordinary gasoline, and a public comment period was held from April 21 to July 30, 2009. Before

[12] http://www.epa.gov/otaq/regs/fuels/rfg/properf/420r08002.pdf, page 172
[13] http://www.illinoisgreenfleets.org/stations/index.html
[14] http://www.illinoisgreenfleets.org/stations/index.html
[15] http://www.nationalaglawcenter.org/assets/crs/RL34265.pdf
[16] http://tonto.eia.doe.gov/energy_in_brief/print_pages/foreign_oil_dependence.pdf
[17] http://energy.senate.gov/public/_files/RL342941.pdf

making a decision, EPA must determine whether there would be any harm to emissions control systems (e.g. catalytic converters). The necessary research is underway, and a decision on the petition could come as early as 2010.[18]

3. Walking/biking

Recommendation: The Village of Westmont should continue to maintain its bike racks, its marked bike routes, and its sidewalks to allow Westmont residents to walk or bike to work, school, and shopping.

Discussion: Many Westmont residents walk or bike to work or at least to the commuter train station in the center of Westmont. Westmont tries to have a sidewalk available on at least one side of each street. Westmont has also marked a system of bike routes to identify the safest and most pleasant routes to the train station as well as to several parks and schools. When the current train station was improved a few years ago, ample bike racks were installed. According to the 2000 census, 3.5% of Westmont residents walk or bike to work. Walking and biking generate no greenhouse gas emissions, and also save money that could have been spent on driving because no fossil fuel is needed.

4. Telecommuting

Recommendation: Westmont employers and employers of Westmont residents should continue to use telecommuting in situations where it makes sense.

Discussion: Due to advances in electronic communications, some white-collar employees no longer need to do all of their work in the office. Some of the work can be done at any location where a telephone and a computer with access to the internet are available, such as the employee's home. On days when an employee can work at home, there is no need to use a car in commuting to work, and thus no need to generate greenhouse gas emissions through commuting. Telecommuting saves time and money.

5. Public transit

Recommendation: Westmont residents should continue to use public transit whenever it is practical for them.

Discussion: Westmont has a station on the Metra Burlington Northern Santa Fe commuter railroad that runs from Chicago to Aurora. Express trains are scheduled to run every twenty minutes or so during the weekday rush hours. We also have two feeder PACE bus routes (and a third from Darien) to bring commuters to the train station. In addition, regular PACE route 715 runs on Cass Avenue through Westmont, providing service from Brookhaven shopping center in Darien to Yorktown shopping center and

[18] http://www.epa.gov/OMS/regs/fuels/additive/lettertogrowthenergy11-30-09.pdf

beyond. According to the 2000 census, 7.6% of Westmont residents take public transportation to work.

6. Transit-oriented development

Recommendation: Westmont should continue to plan and zone for transit-oriented development.

Discussion: Transit-oriented development (TOD) means developing vibrant, livable communities with mixed residential and commercial areas within walking or biking distance of a train station. This makes it possible to live a higher quality life without complete dependence on a car for mobility and survival. TOD calls for relatively higher density development closer to the train station with progressively lower density development spreading outward.

The main design features include:
- Routes and facilities that encourage walking and biking
- Streets with good connectivity, and traffic calming features to control vehicle speeds
- A rich mix of housing, shopping, schools and services within the neighborhood
- Parking management to allow less land to be required for parking
- A train station that is convenient, comfortable, and secure.

TOD is more cost-effective than other types of development, and reduces greenhouse gas emissions by reducing automobile traffic. In addition, high-density housing generally requires less energy for heating and cooling than low-density housing, because the interior space is surrounded by a smaller surface of roof area and outer walls that are exposed to the weather.

Buildings

7. Heating and air conditioning

Recommendation: Whenever their old units need to be replaced, Westmont residents and businesses should purchase Energy Star® qualified heating and air conditioning units.

Discussion: About 82% of the housing units in Westmont are heated with natural gas. Nearly all of the other housing units in Westmont are heated with electricity. The per capita usage of natural gas in Illinois during the current decade is significantly lower than in the two previous decades.[19] One reason is because the new furnaces currently being installed are more efficient than the old furnaces that are being replaced as they wear out. Another reason is because the number of heating degree days per year has declined (i.e., it has gotten warmer).[20]

[19] http://apps1.eere.energy.gov/states/residential.cfm/state=IL
[20] http://apps1.eere.energy.gov/states/residential.cfm/state=IL#avgheat

The national minimum Annual Fuel Utilization Efficiency (AFUE) for new gas furnaces has been set at 78% since 1992; many furnaces manufactured prior to 1992 had AFUE ratings as low as 60%. Energy Star® qualified furnaces have an AFUE of at least 90%. By 2008, Energy Star® gas furnaces comprised 43% of the gas furnaces sold in the USA.[21]

Under the American Recovery and Reinvestment Act of 2009 (ARRA), homeowners can qualify for a tax credit of 30% of the cost (including installation/labor costs) of a 95% efficient gas furnace or boiler.[22] Also, the State of Illinois used ARRA funds to support an additional incentive. Beginning on January 31 and continuing until the available funds were exhausted on April 5,[23] purchasing a 95% efficient gas furnace through a participating contractor qualified for a $350 instant rebate.[24] Rebates were also available for qualifying boilers and heat pumps. In addition, a 25% instant rebate for Energy Star® qualified water heaters was available for three weeks from January 31 to February 21.

The American Council for an Energy-Efficient Economy estimates that a homeowner who currently has an 80% efficient gas furnace and annual gas bills of $1,000 can probably save about $160 per year on gas by replacing his furnace with a 95% efficient furnace[25]

For central air conditioning systems, two ratings are important. The Seasonal Energy Efficiency Ratio (SEER) describes overall system performance on a seasonal basis and the Energy Efficiency Ratio (EER) describes the system's energy efficiency when it's unusually hot outdoors (95° F). The national minimum SEER for new central air conditioning systems was set at 10 in 1992. Prior to 1992, a typical air conditioning system had a SEER of about 6. The national minimum SEER was changed to 13 in 2006. An air conditioning system with a SEER of 13 is 30% more efficient than a system with a SEER of 10. To qualify for an Energy Star®, an air conditioning system has to have a SEER of at least 14 and an EER of 11.5 for split systems. Most air conditioning systems in Westmont are split systems. This means that the condensing unit is outside the building and the evaporator coil is inside.

Under the American Recovery and Reinvestment Act of 2009, homeowners can qualify for a tax credit of 30% of the cost (including installation/labor costs) of a central air conditioning system if it has a SEER of 16 and an EER of 13.[26] The total of the home energy efficiency tax credits that a homeowner can claim in 2009 and 2010 is $1,500. Also, Illinois offered a $500 instant rebate from January 31 to April 5 on the installation of central air conditioners having a SEER of 16.[27]

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[21] http://www.energystar.gov/ia/partners/downloads/2008_USD_Summary.pdf

[22] http://energystar.custhelp.com/cgi-bin/energystar.cfg/php/enduser/std_adp.php?p_faqid=5786

[23] http://www.commerce.state.il.us/dceo/Bureaus/Energy_Recycling/Energy+Star+Rebates/

[24] http://IllinoisEnergy.org/appliances

[25] http://www.aceee.org/consumerguide/heating.htm

[26] http://energystar.custhelp.com/cgi-bin/energystar.cfg/php/enduser/std_adp.php?p_faqid=5697

[27] http://www.IllinoisEnergy/appliances

Commonwealth Edison offers a free on-line home energy analysis tool to help people evaluate the cost-effectiveness of home improvement projects and other purchases. **http://www.energyguide.com/ha/Welcome.aspx?referrerid=79&sid=461**

8. Insulation

Recommendation: Westmont residents and businesses should upgrade their insulation if they haven't done so already.

Discussion: Under-insulated homes waste money. Only 20% of buildings constructed prior to 1980 were well insulated. The attic is the easiest place to add insulation, and also the most important. Residences in Westmont should have at least R-49 (15 inches of fiberglass insulation) in the attic.[28] For example, if you currently have 6 inches of insulation in the attic, you should add at least 9 more inches. Under the American Recovery and Reinvestment Act of 2009, Federal income tax credits are available to help homeowners pay 30% of the cost of installing insulation by December 2010.[29] The tax credit also applies to energy-efficient windows and doors.

9. New construction and renovations

Recommendation: Westmont should continue to implement the entire 2009 International Energy Conservation Code.

Discussion: In 2006, the part of the International Energy Conservation Code that applies to commercial buildings became effective in Illinois. On August 28, 2009, Public Act 096-0778 requiring an energy code for residential buildings was signed into law. It became effective on January 29, 2010, officially establishing the 2009 International Energy Conservation Code as the energy code for residential as well as commercial buildings in Illinois.[30] The Westmont Village Board passed an ordinance adopting the entire International Energy Conservation Code on March 1, 2010.[31]

The International Energy Conservation Code sets standards for construction details such as insulation, doors and windows, heating and cooling equipment, etc. The code will result in new Westmont homes using at least 10% less energy than homes constructed just a few years ago, and save their owners at least $221 per year. The code covers new construction as well as renovations, alterations, additions, and repairs.

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[28] http://www.energystar.gov/index.cfm?c=home_sealing.hm_improvement_insulation_table
[29] http://www.energystar.gov/index.cfm?c=tax_credits.tx_index#c3
[30] http://www.commerce.state.il.us/dceo/Bureaus/Energy_Recycling/IECC.htm
[31] http://www.westmont.il.gov/vertical/Sites/%7BB945AE37-DD18-44D5-97B5-392DDAAAF715%7D/uploads/%7BD2B634E1-F8AB-4132-B323-0CE56FEC4920%7D.PDF

10. Alternative electricity sources

Recommendation: The electricity available to Westmont residents and businesses should be generated mostly from renewable energy and nuclear power in the future.

Discussion: In 2007, Illinois enacted one of the most aggressive renewable energy standards in the country. It requires electric utility companies to provide a gradually increasing percentage of the electricity that they provide from renewable sources such as wind and solar energy, which have no greenhouse gas emissions. The goals increase each year from 5% in 2010 to 25% in 2025. The requirements only apply to electricity that is supplied to residential and small commercial customers. The law was strengthened in 2009. Considering that about half of our electricity in Illinois currently comes from nuclear power, which also has no greenhouse gas emissions, this legislation has put Illinois on track to substantially reduce carbon pollution from electricity generation.

Many of us think of coal as an old fashioned fuel that went out of style at least fifty years ago. But the reality is that the use of coal in the United States has nearly tripled since 1965. We now use much more coal for generating electricity than we ever used for heating homes in the past. In addition to the hazards of coal mining, including accidents and black lung disease, generating electricity from coal-fired power plants also contributes to urban smog, acid rain, and mercury contamination in fish.[32] In addition, mile-long unit trains cause traffic delays in Westmont as they transport coal to power plants. A unit train typically consists of 100 to 110 cars of coal. According to the University of Wyoming, each car holds 100 tons of coal, and 100 tons of coal can only feed one power plant for 20 minutes.[33] There are more than 400 coal-fired power plants in the United States.[34] According to the Department of Energy, burning 100 tons of sub-bituminous coal from Wyoming produces 186 tons of carbon dioxide emissions.[35] Generating electricity from nuclear, hydro, wind, or solar energy does not contribute to any of these problems. National laws and international treaties are needed to further reduce our reliance on coal-fired power plants.

In northern Illinois, natural gas is used to generate some extra electricity during hot days in the summertime when there is an unusually high peak in demand because everyone is using air conditioners. These "peaker plants" can start up and shut down quickly, and are relatively inexpensive to build. Gas-fired power plants generate only about 1.3 pounds of carbon dioxide emissions per kilowatt hour, compared with 2.1 pounds per kilowatt hour for coal-fired power plants.[36] ComEd generally purchases only about 1% to 5% of its electricity from gas-fired power plants.

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[32] http://www.environmentillinois.org/reports/clean-water/clean-water-program-reports/risky-fishing-power-plant-mercury-pollution-and-illinois-sport-fish

[33] http://www.wsgs.uwyo.edu/coalweb/trains/unit.aspx

[34] http://www.eia.doe.gov/cneaf/electricity/epa/epat5p1.html

[35] http://tonto.eia.doe.gov/ask/environment_faqs.asp

[36] http://www.eia.doe.gov/cneaf/electricity/page/co2_report/co2report.html

11. Lighting and Appliances

Recommendation: Westmont residents and businesses should look for the Energy Star® whenever purchasing kitchen appliances, lighting, home electronics, and office equipment.

Discussion: Roughly one third of the electricity used in households in our region is used for heating, air conditioning, and water heating. Another one third is for kitchen and laundry appliances. And the remaining one third is used for lighting, home electronics, and other uses such as irons, hair dryers, electric blankets, power tools, etc.[37]

Incandescent light bulbs are highly inefficient sources of light.[38] Common incandescent light bulbs work by heating up the filament to become white hot and give off some light. About 10% of the electrical energy is turned into light and about 90% is turned into heat. The federal Energy Independence and Security Act of 2007 (EISA) sets energy efficiency standards for light bulbs and appliances. Under EISA, most common light bulbs manufactured after 2014 must use nearly 30% less energy. Specialty bulbs, such as 3-way bulbs are exempt. EISA also requires DOE to develop regulations that would require further energy efficiency for light bulbs by 2020.

Deadline for Manufacturers	Brightness level	Allowable electricity use[39]
1/1/2012	1490-2600 lumens (equal to 100 watt incandescent)	72 watts
1/1/2013	1050-1489 lumens (equal to 75 watt incandescent)	53 watts
1/1/2014	750-1049 lumens (equal to 60 watt incandescent)	43 watts
1/1/2014	310-749 lumens (equal to 40 watt incandescent)	29 watts

Halogen bulbs are efficient enough to meet the EISA standards, but are not efficient enough to qualify for an Energy Star®. They are similar to ordinary incandescent light bulbs but have a trace of halogen (iodine or bromine) vapor mixed with the inert gas inside the bulb. This allows the tungsten filament to get hotter, last longer, and produce more light per watt of electricity.[40] Incandescent light bulb manufacturers will probably come up with other innovations as well.

The Energy Independence and Security Act of 2007 also requires DOE to develop regulations to update the minimum energy efficiency standards for refrigerators, freezers, dishwashers, clothes washers, and several other types of appliances and equipment. Energy Star® qualified appliances are even more efficient than the ones that meet the

[37] http://www.eia.doe.gov/emeu/reps/enduse/er01_enc_tab1.html
[38] http://www.eia.doe.gov/emeu/reps/enduse/er01_us.html
[39] http://eere.typepad.com/energysavers/2009/07/ban-the-bulb-.html
[40] http://www.sylvania.com/ConsumerProducts/AutomotiveLighting/Products/Halogen/HowHalogenWorks.htm

minimum standard. So, Westmont residents and businesses will save money and reduce greenhouse gas emissions from coal-fired power plants just by purchasing new lighting and appliances as their old ones become obsolete.

Westmont residents and businesses can save more money and reduce greenhouse gas emissions by looking for Energy Star® qualified products and purchasing them whenever it makes sense. Under the Illinois Energy Star® Appliance Rebate Program, purchasing clothes washers, dishwashers, refrigerators, freezers, and room air conditioners from participating retailers qualified for a 15% instant rebate on April 16.[41] Funding for the program was originally expected to last until about April 25, but the funding ran out after only one day when over 62,000 appliances were purchased.[42]

Here are a few examples of the benefits of selecting Energy Star® qualified lighting and appliances:

- Compact fluorescent light bulbs are even better than what is required by EISA. Energy Star® qualified compact fluorescent bulbs work differently than incandescent bulbs and they use less than half the electricity allowed under the EISA standard. There is no filament in a fluorescent light. Instead, the tube contains argon and a small amount of mercury vapor. When an electric current passes through the mercury vapor, it generates invisible ultraviolet light which is then converted to visible light by a fluorescent powder that coats the inside of the tube.[43]

- A new Energy Star® qualified refrigerator uses 20% less energy than other new models. This can reduce utility bills by about $165 over the life of the refrigerator. Residents who still have a refrigerator from the 1980s can save $100 per year if they replace it with a new Energy Star® qualified model.[44] A refrigerator from the 1970s uses 4 times as much electricity as a new Energy Star® qualified model.

- A new Energy Star® qualified clothes washer will save about $50 per year on utility bills compared with a new washer that is not Energy Star® qualified. Clothes washers made before 1998 are significantly less efficient than newer models. A new Energy Star® washer will save about $135 per year over these older models.[45]

- Energy Star® qualified dishwashers save about $85 over the lifetime of the new appliance. Dishwashers made before 1994 cost about $40 more per year in utility bills than new Energy Star® qualified models.[46]

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[41] http://www/IllinoisEnergy.org/appliances
[42] http://www.commerce.state.il.us/dceo/Bureaus/Energy_Recycling/Energy+Star+Rebates/

[43] http://www.energystar.gov/index.cfm?c=cfls.pr_cfls_about
[44] http://www.energystar.gov/index.cfm?c=refrig.pr_why_refrigerators
[45] http://www.energystar.gov/index.cfm?c=clotheswash.clothes_washers_save_money
[46] http://www.energystar.gov/index.cfm?c=dishwash.pr_save_many_ways

See the Energy Star® web site for information about home electronics and other Energy Star® qualified products.[47] Products in more than 60 categories are eligible to qualify for the Energy Star®. The Energy Star® web site also provides information to help retailers and other businesses save money.[48]

12. Water conservation

Recommendation: The Village of Westmont should join the Greenest Region Compact of Greater Chicago and promote water conservation.

Discussion: Water conservation is a top priority for the Greenest Region Compact[49], which is an initiative of the Metropolitan Mayors' Caucus. This organization strives to voluntarily improve the region's air, land and water, and minimize waste, in addition to reducing greenhouse gas emissions. Water conservation is one of its top priorities.

Our water bills cover the cost of treating the water and pumping it 25 miles from Lake Michigan to our homes and businesses, and our sewer bills cover the cost of cleaning it up and discharging it back to the environment. The less water we use, the less pumping is needed. American public water supply and treatment facilities use about 56 billion kilowatt-hours per year, or about 4% of the nation's electricity consumption.

Drinking less water won't help. We use most of our water for flushing toilets, taking showers, washing clothes and dishes, and keeping lawns looking nice in the summertime. So, Westmont residents and businesses can do several things to save water and reduce greenhouse gas emissions from coal-fired power plants. They can:

- Fix leaks (A leaky toilet can waste 200 gallons every day.)
- Replace old toilets (Toilets installed before 1994 generally use 3.5 to 5 gallons per flush.[50] The federal Energy Policy Act of 1992 requires new toilets to use 1.6 gallons or less. High efficiency toilets are also readily available. They use 1.3 gallons or less.)
- Buy Energy Star® qualified clothes washers and dishwashers. Energy Star® clothes washers use 17 gallons less water per load[51] and Energy Star® dishwashers use 8 gallons less per load than ones manufactured before 1994.[52]
- Consider watering lawns less (The lawns in our parks look good without any irrigation). The Village of Westmont also restricts lawn sprinkling to certain times.[53]

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[47] http://www.energystar.gov/index.cfm?fuseaction=find_a_product.
[48] http://www.energystar.gov/index.cfm?c=retail.bus_retail
[49] http://www.standingupforillinois.org/uploads/GreenestRegionStrategies.pdf
[50] http://www.epa.gov/watersense/water_efficiency/what_you_can_do.html
[51] http://www.energystar.gov/index.cfm?c=clotheswash.clothes_washers_save_money
[52] http://www.energystar.gov/index.cfm?c=dishwash.pr_save_many_ways
[53] http://www.westmont.il.gov/index.asp?Type=B_PR&SEC=%7B13AE810B-E782-4F89-8B7B-CFBDF90F0A55%7D&DE=%7B50C340C5-275E-4D5C-8E4E-425CECCD1A3E%7D

The Greenest Region Compact also calls for the Village of Westmont to demonstrate its commitment to water conservation by replacing or repairing old leaking water mains.

After water is used, it becomes sewage. There is some pumping involved with managing sewage, so reducing water usage reduces the pumping of sewage as well. Another issue is that the organic material in sewage is going to decompose either aerobically or anaerobically. Aerobic decomposition produces carbon dioxide, while anaerobic decomposition produces methane. The carbon dioxide is not generated from fossil fuels, so it is balanced by plants that take carbon dioxide out of the air as they grow. Methane is 21 times more potent as a greenhouse gas than carbon dioxide, so it can upset the natural balance. It should be noted that the Downers Grove Sanitary District has a wastewater treatment unit called an anaerobic sludge digester. They collect the methane and use it to generate heat for on-site buildings.

Solid Waste

13. Yard Waste

Recommendation: Westmont residents and businesses should continue to mulch yard waste on-site, or use our curbside yard waste collection program to send yard waste to off-site composting facilities.

Discussion: Most lawn clippings are left on the property where they were generated because the clippings contain the nutrients that lawns need, and because the clippings do not contribute to thatch build-up.[54] In addition, Westmont's curbside collection contractor collects yard waste separately from garbage and other recyclable materials. In 2009, 828 tons of yard waste were collected and kept out of landfills, with essentially zero greenhouse gas emissions from the composting facilities.[55] The Village of Westmont also conducts a curbside brush collection on a regular schedule.

When grass clippings are left on the lawn, they will decompose aerobically and release carbon dioxide to the atmosphere. The lawn will remove about the same amount of carbon dioxide from the atmosphere as grass grows, so it doesn't cause a net increase in greenhouse gas concentrations in the atmosphere. When grass clippings and other yard waste decompose anaerobically (in the absence of air), methane is produced. This upsets the natural balance because methane is 21 times more potent as a greenhouse gas than carbon dioxide.

When solid waste is placed in a landfill, it has to be covered with soil each day to control odors and to prevent infestation with vermin. This cuts off the air supply, and thus the organic material will eventually decompose aerobically and generate methane. Landfilling of yard waste would substantially increase the amount of organic material in Illinois landfills, and thus increase the production of methane (not to mention filling up

[54] http://extension.missouri.edu/publications/DisplayPub.aspx?P=G6958
[55] http://epa.gov/climatechange/wycd/waste/downloads/chapter4.pdf , page 50

the scarce landfill space unnecessarily). But Illinois banned the landfilling of yard waste in 1990, and Westmont's residents and businesses continue to cooperate with the state law. Illinois is one of 23 states[56] that have enacted some form of a ban on landfilling yard waste, but unfortunately, more than half the states still allow this practice.

It should also be noted that the yard waste that was landfilled prior to 1990 continues to generate methane as it decomposes over several decades. Much of Westmont's solid waste went to DuPage County's Greene Valley Landfill before it closed in 1997. The landfill has a methane collection system, and the collected methane fuels a 9 megawatt power plant operated by Bio-Energy partners.[57] The combustion process converts the methane to carbon dioxide.

14. Curbside Recycling

Recommendation: The Village of Westmont should continue to promote a high rate of recycling through its curbside collection of recyclable materials and its electronics recycling program.

Discussion: The Village of Westmont provides curbside collection for a wide range of recyclable materials, and has achieved a high rate of recycling. During 2009, Westmont residents and businesses generated 4,078 tons of garbage and 1,723 tons of recyclable materials, in addition to the 828 tons of yard waste described above. This is an overall recycling rate of 38.5%, which is slightly above average for DuPage County.[58]

Paper and plastics are organic wastes that generate methane and carbon dioxide when they degrade in landfills. Recycling these materials keeps them out of landfills. Unfortunately, only 59% of Americans are served by curbside recycling programs.[59] It should also be noted that making new paper products out of waste paper takes less energy than making paper products out of trees. Landfilled glass and metal wastes do not generate methane or carbon dioxide, but making new products from recycled metals and glass uses less energy than making these products from ores (soils and rocks).

Industry

15. Process Efficiency

Recommendation: Westmont's industries are encouraged to make investments in energy conservation that would allow their industrial processes to be more efficient.

Discussion: Some industries generate a lot more greenhouse gas emissions than others.

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[56] http://www.jgpress.com/images/art/0812/sog08_tables.pdf

[57] www.epa.gov/lmop/proj/xls/lmopdatail.xls

[58] http://www.dupageco.org/emplibrary/2007%20Annual%20Report.pdf

[59] http://www.epa.gov/waste/nonhaz/municipal/pubs/msw07-rpt.pdf ,Table 25, page 142

In addition to coal-fired power plants, several other industries burn huge amounts of fuel. EPA has identified a few dozen industries that generate greenhouse gas emissions in their industrial process. Oil refineries and factories that make steel, lime, and Portland cement are a few examples. In addition, certain industries generate emit hydrofluorocarbons, perfluorocarbons, sulfur hexafluorides. These chemical compounds are much more potent greenhouse gases than carbon dioxide. On October 30, 2009, EPA published a final rule requiring industries that generate more than 25,000 metric tons per year of carbon dioxide equivalent emission to measure their emissions and report them to EPA. Most of these large emitters already report other emissions such as sulfur dioxide for example. Limits on greenhouse gas emissions need to be set for these large emitters at the national level, and Congress is currently considering this issue. Westmont's industries are probably not large enough to be affected by these reporting requirements or emissions limitations.

All industries, including those in Westmont, need some form of energy to make their products. Most people understand that conserving energy is a good idea. Industries in Westmont are encouraged to make cost-effective improvement is their processes. Often a capital investment is needed that will pay for itself in energy savings over several years. Sometimes, industries are reluctant to make such investments if their long-term future is uncertain, but such investments might actually strengthen the company's long-term prospects.

Adaptation

Because Illinois is not close to oceans or mountains, the effects of rising sea levels and melting glaciers are not felt directly in our area. However, some changes have already been observed, and additional changes are expected, even if the nations of the world are able to agree on a plan to reduce greenhouse gas emissions. No one is proposing to roll back global warming to pre-industrial levels, but only to hold global warming within a reasonable range to prevent the most dire consequences. We have already experienced a world-wide temperature increase of 0.76°C (1.37° F) above the 1850-1899 average, with most of that change occurring since the 1970s.[60] Scientists recommend trying to limit the increase to 2°C (3.6°F). Holding temperature increases within this range can actually have some local benefits, such as fewer weather-related deaths during the winter, reducing winter heating bills, and extending the summer growing season.

EPA's technical support document for its endangerment finding gives this description of climate change in the Midwest:

> "In recent decades, an increase in average temperatures in the Midwest has been observed despite the strong year-to-year variations (Karl et al., 2009). The greatest increase has been measured in winter, reducing lake ice and extending the length of the frost-free or growing season by more than one week. Heat waves have been more frequent in the Midwest in the last three decades than any time in the last century outside of the Dust

[60] www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf pages 5 and 6

> Bowl years of the 1930s. Climate models indicate that summer average temperature in Illinois and Michigan is expected to feel progressively more like summers currently experienced in the southeastern states. The last three decades have been the wettest period in a century, with above average summer and winter precipitation. Precipitation in the Midwest is projected to increase in winter and spring, but decrease in summer in some parts of the region. Heavy downpours are now twice as frequent as they were a century ago, and the intensity of rainfall events is also expected to increase in the future."[61]

16. Planting trees

Recommendation: Westmont residents and businesses should maintain existing trees and plant additional ones.

Discussion: Planting and maintaining trees can help mitigate flooding in the spring, and mitigate the effects of summer heat waves. Landscape designs that capture rain where it falls and provide shade in the summertime can be very helpful. Chicago's Climate Action Plan has some additional ideas.[62]

Planting a tree would be a great way to celebrate Arbor Day, the last Friday in April. J. Sterling Morton of Nebraska organized the first Arbor Day, and it has been celebrated throughout the country for more than 135 years.[63] His son, Joy Morton, moved to the Chicago area and founded the Morton Arboretum in Lisle, as well as the Morton Salt Company.[64]

MUNICIPAL OPERATIONS STRATEGIES

Transportation

17. Anti-idling policy

Recommendation: Westmont should continue to operate its vehicles under its August 27, 2008 anti-idling policy, and look into safely eliminating some of the exemptions.

Discussion: Unnecessary idling wastes money, adds to urban smog, and contributes greenhouse gasses to the atmosphere. The policy applies to Public Works and other Village-owned vehicles. However, most Police and Fire Department activities are exempt. Westmont should conduct a test on a police vehicle without the engine running to see how long the flashing lights, the computer, and other electrical equipment can operate until the battery is drained. Older lighting systems and computers required the vehicle to idle, but times have changed, and the Fort Wayne Police Department has

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[61] http://epa.gov/climatechange/endangerment/downloads/Endangerment%20TSD.pdf , page 144.
[62] http://www.chicagoclimateaction.org/pages/chicago_climate_action_plan/45.php
[63] http://www.arborday.org/arborday/celebrate.cfm
[64] http://www.anb.org/articles/10/10-02297.html

determined that idling is not needed nowadays.[65] If Westmont's test shows that the battery cannot sustain the operation of the lights and computer for a sufficient time without idling, then the Village should evaluate an innovative product that allows the electrical equipment to operate for up to five hours without the engine running. This product has already been employed by the Dallas Police Department.[66]

18. Fuel economy

Recommendation: Each new vehicle purchased by the Village should get better fuel economy than the older vehicle that it replaces, and the Village should continue reducing the number of vehicles that it owns.

Discussion: By 2009, greenhouse gas emissions from municipal vehicles had been reduced by 24% below the 2000 level because the Village used 26,000 fewer gallons of vehicle fuels. That's a reduction of 236 metric tons per year.

The Village has reduced its fuel costs and greenhouse gas emissions by purchasing new vehicles that are more fuel efficient than the older vehicles that are being replaced. The Public Works Department has been replacing old gasoline-powered trucks with new diesel-powered trucks that are more fuel efficient. In addition, the 2009 model of the Ford Crown Victoria is more fuel efficient than the 2000 model.

Whenever the Village purchases a new vehicle, it should take one or more older vehicles out of service. The new vehicle should get at least 1 mile per gallon better fuel economy in city driving than the vehicle that is being replaced. The EPA's estimates of miles per gallon in city driving posted at www.fueleconomy.gov should be used whenever making this comparison for vehicles weighing less than 10,000 pounds (cars and light trucks). The estimates of fuel efficiency in highway driving are irrelevant since the Village's vehicles rarely travel on interstate or rural highways.

For example, a 2008 Ford Crown Victoria gets 15 miles per gallon using gasoline and 11 miles per gallon using E-85. It could be replaced by either a 2010 Ford Crown Victoria which gets 16 mpg on gasoline and 12 mpg on E-85, or a 2009 Chevrolet Tahoe 4-Wheel Drive Hybrid, which gets 20 mpg on gasoline (does not run on E-85). But it could not be replaced by a 2009 Chevrolet Tahoe 2-Wheel Drive 1500 XFE which gets 15 mpg on gasoline and 11 mph on E-85, because this would not be an improvement in fuel economy.

The Village of Westmont should continue reducing the total number of vehicles that it owns. The Village has already eliminated some Fire Department automobiles that were rarely used, but still had maintenance expenses. The Village should continue looking for similar opportunities.

[65] http://www.journalgazette.net/apps/pbcs.dll/article?AID=/20080226/LOCAL0201/802260311
[66] http://www.govtech.com/gt/723276

19. Alternative fuels

Recommendation: The Village should maximize the use of biodiesel, and should increase the use of ethanol in vehicles owned by the Village. To do so, it will be necessary to convert one of its gasoline storage tanks during 2010 to hold an 85% ethanol blend (E-85) for use in its flex-fuel vehicles.

Discussion: Westmont should reduce direct greenhouse gas emissions from fuels burned in village-owned vehicles by 44% from the 2000 level by 2012 and by 64% by 2020.

The use of biodiesel in the USA has been increasing rapidly from 2 million gallons in 2000 to 75 million gallons in 2005 to 700 million gallons in 2008, although this is still a small percentage of all diesel fuel used.[67] The Village of Westmont began using biodiesel blends in 2005, and greatly expanded its use in 2006. Accordingly, Westmont has earned recognition under the Illinois Green Fleets program for using biodiesel blends in its 46 diesel vehicles.[68] Westmont uses B11 during the winter and B20 during the summer. Overall Westmont used 7.4% biodiesel in 2005, 14.7% in 2006, 14.5% in 2007, 10.9% in 2008, and 12.4% in 2009. Westmont stopped using B-20 during 2008 and much of 2009 due to a concern about vehicle warranties. This concern has now been resolved, so Westmont should resume using B-20 as much as possible.

The Village experimented with using E-85 in 2006, but determined that it would only be practical to use E-85 if it was conveniently available at the Village's municipal refueling station. Since then, the Village has purchased additional flex-fuel vehicles, mostly Ford Crown Victoria police cruisers. Flex-fuel equipment is standard for those vehicles, and the Village should continue purchasing flex-fuel vehicles whenever possible in the future. The Village now has at least 21 flex-fuel vehicles, and it now makes sense to convert one of its two gasoline storage tanks to hold E-85. Replacing half of its gasoline usage with E85 can reduce the Village's greenhouse gas emissions from vehicles by about 200 tons per year. Assuming the tank conversion works out well, the Village would have an opportunity achieve a reduction of another 200 tons per year by 2020 by converting the other gasoline tank to E-85.

Buildings

20. Energy audits

Recommendation: As soon as possible, the Village should implement the recommendations presented in the Smart Energy Design Assistance Center's (SEDAC) energy audit of the Police Headquarters/Fire Station at 500 N. Cass Avenue, dated November 11, 2009. It should also have energy audits conducted for the other Village-owned buildings, and implement all reasonable recommendations.

[67] http://www.biodiesel.org/resources/faqs/

[68] http://www.illinoisgreenfleets.org/green-fleets/fleets.html

Discussion: By 2009, greenhouse gas emissions from Village-owned buildings had already been reduced by 26% below the 2000 level. One reason for this improvement was that the old Village Hall and Annex buildings were demolished and the new Village Hall building was opened in 2001. The new Village Hall building uses almost no natural gas at all. Another reason is that the natural gas usage in the two Public Works buildings (the Water Division building and the Street Division building) has been cut in half since 2000.

SEDAC conducted the energy audit at the Police Headquarters building at no charge to the Village. SEDAC is sponsored by the Illinois Department of Commerce and Economic Opportunity in partnership with ComEd and Ameren. SEDAC is managed by the University of Illinois at Urbana-Champaign and the 360 Energy Group. SEDAC will audit another building if the Village implements the recommendations of the Police/Fire Station audit. Due to the high demand for SEDAC's services, it appears unlikely that they would audit more than one building per year.

SEDAC recommended investing in five Energy Cost Reduction Measures (ECRMs) that would have an overall rate of return of 14%. The report states that these five ECRMs would require initial investments of $115,000, although the cost can be reduced if some of the work can be performed by Village staff. These investments would result in cost savings of $19,000 per year. The Village cannot afford to pass up this opportunity. The SEDAC report also describes several other ideas that should be considered after the five ECRMs have been implemented.

SEDAC encourages the Village of Westmont to apply to the Illinois Department of Commerce and Economic Opportunity (DCEO) Public Sector Electric Efficiency Program, which offers incentives to owners of public buildings (municipalities, school and park districts) who plan to implement electric efficiency measures. Applying to this program in advance is required to reserve funding. The application must be received before work begins in order to be eligible for funding. Appendix B of the SEDAC report also describes other funding opportunities.

Additional audits are needed for the Village, Hall, Westmont Centre, Train Station, Fire Department Headquarters, Water Department, and Street Department buildings. It could take six years to complete the audits at the current rate. We recommend that the Village should speed up the process by contracting with someone else to conduct some of the energy audits. We recommend that a company be hired to audit two or three buildings during calendar year 2010. In the meantime, the Village should continue to obtain free audits from SEDAC for the remaining buildings. Of course, the Village should promptly implement the recommendations.

Implementing the recommendations of the November 2009 energy audit on the Police Headquarters/Fire Station building can reduce natural gas usage in that building by 16.9%. By having energy audits conducted on the other Village buildings, we assume that overall natural gas usage could be reduced by about 10 to 15% of the 2009 level,

which would be 7 to 11% of the 2000 level. Some improvements are easier and less costly to implement than others, so we assumed that one half of the reductions can be achieved by 2012 and the other half by 2020.

21. New construction

Recommendation: The Village of Westmont should adopt the 2030 Challenge Resolution as proposed by the U.S. Conference of Mayors and the American Institute of Architects.

Discussion: According to the U.S. Conference of Mayors, the initial construction cost represents only 20 to 30% of the buildings entire cost over a 30 to 40 year life cycle. Also, the financial benefits of green building are more than ten times the additional 2% construction cost.[69] So, if Westmont should need to construct any new municipal buildings or renovations, those buildings should be designed such that the projected fossil-fuel energy consumption should be well below the national average for that building type. The U.S. Conference of Mayors[70] encourages municipalities to adopt a resolution accepting the following fossil fuel energy use goals recommended by the American Institute of Architects[71]:

Buildings constructed or renovated (year)	Fossil fuel consumption target (% below national average)
2010 to 2014	60%
2015 to 2019	70%
2020 to 2024	80%
2025 to 2029	90%
2030 and after	Carbon neutral

Solid Waste

22. Office paper recycling

Recommendation: Westmont should continue to promote recycling in its municipal offices.

Discussion: The waste from offices is mostly paper. Westmont has collected recyclable materials in its municipal offices for many years. Waste paper is an organic waste that generates carbon dioxide and methane when it degrades in landfills, but recycling waste paper keeps it out of landfills. In addition, making new paper products out of waste paper

[69] http://www.usgbc.org/Docs/News/News477.pdf

[70] http://www.usmayors.org/74thAnnualMeeting/resolutions/ProposedResolutions_Energy.pdf

[71] http://www.aia.org/aiaucmp/groups/aia/documents/pdf/aias078718.pdf

takes less energy than making new paper products out of trees.

23. Traffic signals & street lighting

Recommendation: Energy-efficient light-emitting diode (LED) technology should be evaluated for all new installations.

Discussion:
All five of the traffic signals that are operated and maintained by the Village of Westmont have already been converted to LED. Most traffic signals in Westmont are located on state or county highways that run through our Village, so they are operated and maintained by the state or the county. The county is on a schedule to convert its traffic signals to LED, while the state is not.

Retrofitting existing street lights with LED would be quite expensive, and the payback period is often greater than the life expectancy. New installations are somewhat more economical as they are manufactured from the start to accommodate the LED technology. Since LED street lighting has only recently become available, there are no industry standards yet. Other municipalities are already running into inconsistencies between manufacturers, etc. It is not only photometric quality, but issues such as color temperature come into play as well. Other concerns include light distribution differences, harsh weather, and so on. For now, the best we can recommend is that low power LED technology will be evaluated for all new installations (other than lone replacements due to knock downs, etc.)

Adaptation

24. Planting trees

Recommendation: Westmont should maintain its existing trees and plant additional ones in the parkways between the streets and sidewalks throughout the Village.

Discussion: Planting and maintaining trees can help mitigate flooding in the spring, and mitigate the effects of summer heat waves. Landscape designs that capture rain where it falls and provide shade in the summertime can be very beneficial.

APPENDIX - EMISSIONS INVENTORY

Methodology

This inventory of greenhouse gas emissions is focused on direct emissions in the Village of Westmont's municipal operations and in the community. It does not cover the operations of overlapping local governmental units, such as the county, the sanitary districts, the school districts, the park district, or the library district.

This inventory also covers indirect emissions from the use of electricity in Westmont. But to keep it simple, it does not cover any other upstream indirect emissions. For example, although Westmont residents eat food, this inventory does not cover greenhouse gas emissions from agriculture. And although Westmont residents and businesses use industrial products, this inventory does not cover the emissions from industries located outside of Westmont. Likewise, this inventory does not cover the emissions from transporting those products to Westmont.[72]

In addition, this inventory does not cover downstream indirect emissions from disposal of our solid waste or treatment of our wastewater, because the solid waste generated in Westmont is landfilled elsewhere and our sewage is treated in adjacent communities.

Tracking direct emissions plus indirect emissions only from our electricity usage is consistent with the guidance for U.S. EPA's "Climate Leaders" program[73], and the "Scope 2" protocol developed by the Greenhouse Gas Protocol Initiative.[74]

The Village of Westmont retained records of the amounts of natural gas, vehicle fuels, and electricity that it used for municipal operations since 2000, but does not have records for earlier years. Therefore, 2000 has been selected as our baseline year. Data from 2005 and 2009 are also presented for comparison. Estimates of natural gas, vehicle fuels and electricity used throughout the community of Westmont are based on tax records.

1. Natural Gas

Natural gas is metered by volume (units of 100 cubic feet) and is delivered to most municipal buildings at normal pressure. However, gas is delivered to the Police Department Headquarters building and the Fire Department building at higher pressures. To account for the higher pressures, the metered amounts delivered to the Police Department Headquarters building and the Fire Department Headquarters buildings are

[72] Upstream indirect emission can be significant. For example, it takes about 21,000 Btu of energy to make an amount of gasoline having a heating value of 100,000 Btu from crude oil and deliver it to your local gas station. See http://www1.eere.energy.gov/biomass/environmental.html For biodiesel, see http://www.afdc.energy.gov/afdc/fuels/biodiesel_benefits.html, and for ethanol, see http://www.afdc.energy.gov/afdc/ethanol/balance.html

[73] http://www.epa.gov/climateleaders/resources/inventory-guidance.html

[74] http://www.ghgprotocol.org/calculation-tools/faq

multiplied by factors of 1.106 and 1.119 respectively. Quantities of natural gas were then multiplied by the emission factor presented in the U.S. Department of Energy's *Simplified Emissions Inventory Tool* (SEIT), Version 2.1 (2009).[75] The heating value (Btu factor) of natural gas varies somewhat, and the heating value of Nicor's natural gas falls within the range of 1000 to 1025 British thermal units per standard cubic foot, so the appropriate emission factor is 5.862 kilograms of carbon dioxide per 100 standard cubic feet of natural gas. We added 0.3% to account for methane and nitrous oxide emissions. Thus, we used an emission factor of 5.88 kilograms of carbon dioxide equivalent per 100 standard cubic feet of natural gas.

Nicor provided the following information about the use of natural gas throughout the community of Westmont:

Village Wide Natural Gas Use

		Therms Supplied By Nicor	Therms Supplied By Others	Total Therms
2007	Residential	6,989,171	573,438	7,562,609
	Commercial	2,879,436	3,739,597	6,619,033
	Industrial	137,419	87,025	224,445
	Other	9,669	-	9,669
	Total 2007	**10,015,696**	**4,400,061**	**14,415,756**
2008	Residential	7,605,573	785,345	8,390,918
	Commercial	3,258,361	3,806,359	7,064,720
	Industrial	155,146	74,115	229,261
	Other	8,054	-	8,054
	Total 2008	**11,027,135**	**4,665,819**	**15,692,954**
2009	Residential	7,059,075	777,164	7,836,239
	Commercial	3,445,406	3,341,556	6,786,962
	Industrial	162,988	68,129	231,118
	Other	7,789	-	7,789
	Total 2009	**10,675,258**	**4,186,849**	**14,862,108**

It should be noted that the number of heating degree days in 2009 was higher than in 2007, and the number in 2008 was higher than 2009.

To estimate residential and commercial use of natural gas in 2000 and 2005, we assumed that the changes in per capita usage rates were proportional to the changes in state-wide per capita rates. We divided the total therms used in 2007 by the total population of Westmont to get the 2007 residential and commercial per capita rates. We divided state-wide totals for residential and commercial usage[76] by the state population in those years to get the state-wide per capita usage rates. Then we estimated the per capita rates for

[75] http://www.eia.doe.gov/oiaf/1605/reporting_tools.html#seit
[76] http://www.eia.doe.gov/emeu/states/_seds.html

Westmont in 2000 and 2005 by assuming that the ratios of Westmont per capita rates to the State-wide per capita rates were the same as in 2007. Then we multiplied the estimated per capita rates by the population of Westmont in those years to get the total therms for residential and commercial uses in 2000 and 2005. We assumed that the industrial and other uses of natural gas were about the same as in 2007.

		Million BTUs per capita	Population	Total Therms
2000	Residential	32.67	24,554	8,020,000
	Commercial	26.24	24,554	6,440,000
	Industrial			230,000
	Other			10,000
	Total 2000			**14,700,000**
2005	Residential	29.55	25,675	7,590,000
	Commercial	25.34	25,675	6,510,000
	Industrial			230,000
	Other			10,000
	Total 2005			**14,340,000**
2009	Residential	29.92	26,188	7,836,239
	Commercial	25.92	26,188	6,786,962
	Industrial			231,118
	Other			7,789
	Total 2009			**14,862,108**

The SEIT gives an emission factor of 5.29 kilograms of carbon dioxide per therm, and we increased that factor by 0.03% to 5.31 to account for traces of methane and nitrous oxide.

2. Vehicle Fuels

The amount of gasoline and diesel fuel sold in Westmont was estimated based on motor fuel tax records for Westmont. We know that this is a very imprecise estimate, but there are no better records available. Residents of Westmont work and shop in other communities in the Chicago area, while non-residents work and shop in Westmont. Likewise, Westmont residents and businesses purchase vehicle fuels in other communities, and people from other communities purchase vehicle fuels in Westmont.

Year	Gallons of Motor fuel sold in Westmont
2000	18,302,778
2005	17,649,992
2006	18,353,446
2007	18,028,996
2008	17,219,004
2009	20,261,481

Since our tax records do not differentiate between gasoline and diesel fuel, statewide averages were used to estimate that 20% of the motor fuel sold in 2000[77] was diesel fuel,

[77] http://www.fhwa.dot.gov/ohim/hs00/mf21.htm

and 22% was diesel fuel in 2005.[78] Statewide statistics are not available yet for 2009, so we assumed that the upward trend would continue and approximately 24% of the motor fuel sold in 2009 was diesel fuel. Carbon dioxide emissions from renewable fuels, such as the ethanol component of gasoline, have not been included in our inventory of greenhouse gas emissions.[79] This is because the tailpipe emissions of carbon dioxide from burning renewable fuels are generally balanced by removal of carbon dioxide from the air as new corn and soybean plants grow. We assumed that all of the gasoline sold in Westmont contained 10% ethanol[80], and that the diesel fuel used by the community at large contained no biodiesel. In other words, the petroleum component of the gasoline used in Westmont is 90% of the total. To calculate carbon dioxide emissions, the quantities of petroleum fuels were multiplied by the emissions factors found in the SEIT.[81]

Traces of two other greenhouse gases are present in the tailpipe from vehicles: methane and nitrous oxide. Calculating emissions of methane and nitrous oxide is more complicated than calculating carbon dioxide emissions, but it has only a small effect on the total equivalent carbon dioxide emissions. Emissions of these two gases are related to the type of emission control equipment that the vehicle has, especially the catalytic converter. Methane is 21 times more potent as a greenhouse gas than carbon dioxide, and nitrous oxide is about 310 times more potent. We used emission factors of 9.0 kilograms of carbon dioxide equivalent per gallon for gasoline and 10.2 for diesel. These emission factors account for methane and nitrous oxide emissions.

The use of vehicle fuels for municipal operations has changed since 2000. As vehicles need to be replaced, old trucks that used gasoline have been replaced with new trucks that use diesel fuel. Also, the Village began using emissions biodiesel near the end of 2005.

3. Electricity

ComEd provided the following information about electricity usage in Westmont:

Westmont Village Wide Electricity Usage

Year	REVENUE_CLASS	Total kWh
2002	01-Residential	74,829,321
	03-Small Comm Indust	114,193,629
	05-Large Comm Indust	26,715,646
	06-Street and Highway Light	675,513
	07-Sales to Public Authority	10,151,398

[78] http://www.fhwa.dot.gov/policy/ohim/hs05/htm/mf21.htm
[79] http://www.eia.doe.gov/oiaf/1605/January2007_1605bTechnicalGuidelines.pdf , page 63
[80] http://www.epa.gov/otaq/regs/fuels/rfg/properf/420r08002.pdf, page 172
[81] http://www.eia.doe.gov/oiaf/1605/reporting_tools.html#seit

	25-Small US Government	353,640
	Total 2002	**226,919,147**
2005	01-Residential	80,452,482
	03-Small Comm Indust	121,445,337
	05-Large Comm Indust	32,900,369
	06-Street and Highway Light	1,261,770
	07-Sales to Public Authority	241,848
	25-Small US Government	2,176,224
	Total 2005	**238,478,030**
2009	Residential	71,735,039
	Small Comm Indust	115,591,982
	Large Comm Indust	27,099,719
	Street and Highway Light	1,328,835
	Small US Government	2,825,159
	Total 2009	**218,580,733**

We estimated that the electricity used in 2000 was a little less than that used in 2002 because there were fewer cooling degree days at Midway Airport in 2000 than in 2002. It should also be noted that the number of cooling degree days in 2005 was about the same as 2002, but 2009 had fewer cooling degree days than 2002.

There are no electric utility power plants in Westmont. Commonwealth Edison buys electricity that has been generated elsewhere and sells it to Westmont customers. The average amount of emissions per 1,000 kilowatt-hours (kwh) for carbon dioxide are taken from Commonwealth Edison's *Environmental Disclosure Statements* for the 12-month periods ending December 2000[82], December 2005[83] and December 2009.[84] Traces of two other greenhouse gases (methane and nitrous oxide) are present in the smokestack emissions of coal-fired power plants. Since these two gases are present in such small concentrations, we estimated their combined effect to be equivalent to about one-half of one percent of the carbon dioxide emissions. Accordingly, we have adjusted the carbon dioxide emission reported by Commonwealth Edison upward by multiplying by a factor of 1.005. Then we converted the emissions from pounds per kilowatt-hour to kilograms per kilowatt-hour by multiplying by a factor of 0.4536 kilograms per pound.

Calculation of the Emissions Factor for Electricity

[82] http://www.icc.illinois.gov/downloads/public/en/010401comed.pdf
[83] http://www.icc.illinois.gov/downloads/public/en/060401edisComed.pdf
[84] http://www.icc.illinois.gov/downloads/public/en/comedenvirodis%20closure.pdf

	Carbon dioxide emissions (pounds per 1,000 kilowatt-hours)	Adjustments	**Emissions Factor** (Carbon dioxide equivalent emissions in kilograms per 1,000 kilowatt-hours)
2000	511.95	x 1.005 x 0.4536	233.4
2005	486.7	x 1.005 x 0.4536	221.9
2009	743.46	x 1.005 x 0.4536	338.9

Clearly, the emissions factor is much higher in some years than others. This is because Commonwealth Edison purchases electricity from several different suppliers. The emissions factor represents the average emissions per 1,000 kilowatt hours from all sources used during that year. Wind, hydro-electric and nuclear plants do not produce any greenhouse gas emissions at all. The emissions factor is highly dependent on the amount of electricity that Commonwealth Edison purchases from coal-fired power plants that year.

Sources of the Electricity Supplied to Commonwealth Edison

Source of Electricity	2000	2005	2009
Biomass	0%	1%	1%
Coal-fired	22%	9%	33%
Hydro	0%	0%	1%
Natural gas	2%	1%	5%
Nuclear	75%	89%	59%
Solar	0%	0%	0%
Wind	0%	0%	1%
Unknown (purchased from other companies)	1%	0%	0%
TOTAL	100%	100%	100%

Summary of Findings

Community-wide emissions in 2000

Source	**Quantity**	**Emissions factor**	**Greenhouse gas emissions** (Metric tons)
Natural Gas	14,700,000 therms	5.31 kg CO2e/therm	78,000
Petroleum Gasoline	13,180,000 gallons	9.0 kg CO2e/gallon	119,000
Diesel fuel	3,660,000 gallons	10.2 kg CO2e/gallon	37,000
TOTAL DIRECT EMISSIONS			234,000
Electricity	220,000,000 kilowatt-hours	233.4 kg CO2e/1000 kwh	51,000
TOTAL			285,000

Community-wide emissions in 2005

Source	**Quantity**	**Emissions factor**	**Greenhouse gas emissions** (Metric tons)
Natural Gas	14,340,000 therms	5.31 kg CO2e/therm	77,000
Gasoline	12,390,000 gallons	9.0 kg CO2e/gallon	112,000
Diesel fuel	3,880,000 gallons	10.2 kg CO2e/gallon	40,000
TOTAL DIRECT EMISSIONS			229,000
Electricity	238,478,030 kilowatt-hours	221.9 kgCO2e/1000 kwh	53,000
TOTAL			282,000

Community-wide emissions in 2009

Source	**Quantity**	**Emissions factor**	**Greenhouse gas emissions** (Metric tons)
Natural Gas	14,862,108 therms	5.31 kg CO2e/therm	79,000
Gasoline (E-10)	13,860,000 gallons	9.0 kg CO2e/gallon	125,000
Diesel fuel	4,860,000 gallons	10.2 kg CO2e/gallon	50,000
TOTAL DIRECT EMISSIONS			254,000
Electricity	218,580,733 kilowatt-hours	338.9 kgCO2e/1000 kwh	74,000
TOTAL			328,000

Emissions from Municipal Operations in 2000[85]

Source	Quantity	Emissions factor	Greenhouse gas emissions
Natural Gas	Hundred Cubic Feet (CCF)	Kilograms CO2e/CCF	Metric tons
Village Hall	7,415	5.88	43.6
Police Dept Headquarters	36,797	5.88	216.4
Fire Dept Headquarters	10,216	5.88	60.1
Westmont Centre	7,640	5.88	44.9
Train Station	2,250	5.88	13.2
Water Division	23,880	5.88	140.4
Street Division	14,398	5.88	84.7
SUBTOTAL			603
Vehicle Fuels	Gallons	Kilograms CO2e/gallon	Metric tons
Gasoline	78,852	9.0	710
Ethanol	8,761	0	0
Diesel fuel	26,897	10.2	274
SUBTOTAL	114,510		984
TOTAL DIRECT EMISSIONS			1587
Electricity	Kilowatt-hours	Kg CO2e/1000 kwh	Metric tons
Village Hall	750,000*	233.4	175.0
Police Dept Headquarters	750,000*	233.4	175.0
Fire Dept Headquarters	250,000*	233.4	58.4
Westmont Centre	212,280	233.4	49.5
Train Station	62,107	233.4	14.5
Water Division Building	92,400	233.4	21.6
Main Water Pumps	234,963	233.4	54.8
Water Towers	17,844	233.4	4.2
Street Division Building	84,000*	233.4	19.6
Street lights and signals	675,513	233.4	157.7
SUBTOTAL			730
TOTAL DIRECT & INDIRECT			2317

[85] The current Westmont Village Hall building was under construction in 2000, so we used the amount of natural gas used during 1999 by the two Village buildings that were demolished to make way for the current building.

*Estimated

Emissions from Municipal Operations in 2005

Source	Quantity	Emissions factor	Greenhouse gas emissions
Natural Gas	Hundred Cubic Feet	Kilograms CO2e/CCF	Metric tons
Village Hall	0	5.88	0
Police Dept Headquarters	27,490	5.88	161.6
Fire Dept Headquarters	12,806	5.88	75.3
Westmont Centre	16,203	5.88	95.3
Train Station	3,090	5.88	18.2
Water Division	9,435	5.88	55.5
Street Division	10,438	5.88	61.4
SUBTOTAL			467
Vehicle Fuels	Gallons	Kilograms CO2e/gallon	Metric tons
Gasoline	68,535	9.0	617
Ethanol	7,615	0	0
Diesel	24,954	10.2	255
Bio-diesel	1,538	0	0
SUBTOTAL	102,642		872
TOTAL DIRECT EMISSIONS			1339
Electricity	Kilowatt-hours	kgCO2e/1000 kwh	Metric tons
Village Hall	750,000*	221.9	166.4
Police Dept Headquarters	750,000*	221.9	166.4
Fire Dept Headquarters	246,900	221.9	54.8
Westmont Centre	235,600	221.9	52.3
Train Station	70,740	221.9	15.7
Water Division Building	73,680	221.9	16.3
Main Water Pumps	239,750	221.9	53.2
Water Towers	28,492	221.9	6.3
Street Division Building	11,719	221.9	2.6
Street lights and signals	1,261,770	221.9	280.0
SUBTOTAL			814
TOTAL DIRECT & INDIRECT			2153

*Estimated

Emissions from Municipal Operations in 2009

Source	Quantity	Emissions factor	Greenhouse gas emissions
Natural Gas	Hundred Cubic Feet	Kilograms CO2e/CCF	Metric tons
Village Hall	12	5.88	0.1
Police Dept Headquarters	29,603	5.88	174.1
Fire Dept Headquarters	15,042	5.88	88.4
Westmont Centre	9,536	5.88	56.1
Train Station	2,911	5.88	17.1
Water Division	10,002	5.88	58.8
Street Division	8,351	5.88	49.1
SUBTOTAL			444
Vehicle Fuels	Gallons	Kilograms CO2e/gallon	Metric tons
Gasoline	53,638	9.0	483
Ethanol	5,960	0	0
Diesel	25,942	10.2	265
Bio-diesel	2,703	0	0
SUBTOTAL	88,243		748
TOTAL DIRECT EMISSIONS			1192
Electricity	Kilowatt-hours	kgCO2e/1000 kwh	Metric tons
Village Hall	769,427	338.9	260.8
Police Dept Headquarters	756,516	338.9	256.4
Fire Dept Headquarters	244,140	338.9	82.7
Westmont Centre	164,705	338.9	55.8
Train Station	68,460	338.9	23.2
Water Division Building including pumps	241,372	338.9	81.8
Water Towers	27,845	338.9	9.4
Street Division Building	87,327	338.9	29.6
Street lights and signals	1,328,835	338.9	450.3
SUBTOTAL			1250
TOTAL DIRECT & INDIRECT			2442